

(19)



(11) EP 1 743 975 A1

(12)

**EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 158(3) EPC

(43) Date of publication:

17.01.2007 Bulletin 2007/03

(51) Int Cl.:

D21H 13/10 (2006.01) A61K 8/00 (2006.01)  
A61K 8/04 (2006.01) A61K 8/42 (2006.01)  
D04H 1/42 (2006.01) D21H 15/02 (2006.01)

(21) Application number: 05719162.9

(22) Date of filing: 16.02.2005

(86) International application number:  
PCT/JP2005/002310

(84) Designated Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT L1 LT LU MC NL PL PT RO SE SI SK TR

(30) Priority: 19.02.2004 JP 2004042880

16.03.2004 JP 2004074238

(71) Applicant: TORAY INDUSTRIES, INC.  
Tokyo 103-8666 (JP)

(72) Inventors:

• NARUSE, Yoshihiro  
Shiga 5200842 (JP)

• MATSUNASE, Takeo  
Moriyama Park Homes 704,  
Shiga 5240032 (JP)  
• OCHI, Takashi  
Shizuoka 4110033 (JP)  
• MURAKAMI, Kakuji  
Shiga 5203034 (JP)  
• NONAKA, Shulchi  
Shiga 5200842 (JP)

(74) Representative: Coleiro, Raymond et al  
MEWBURN ELLIS  
York House  
23 Kingsway  
London WC2B 6HP (GB)

(54) **NANO-FIBER COMPOUNDED SOLUTION, EMULSION AND GELLING MATERIAL AND METHOD FOR PRODUCTION THEREOF, AND NANO-FIBER SYNTHETIC PAPER AND METHOD FOR PRODUCTION THEREOF**

(57) This invention provides compound solutions, emulsions and gels excellent in homogeneous dispersibility and long-term dispersion stability and also excellent in the properties as cosmetics, using disarranged nanofibers not limited in either form or polymer, widely applicable and small in the irregularity of single fiber diameter. This invention also provides a method for producing them. Furthermore, this invention provides synthetic papers composed of fibers, small in pore area and uniform in pore size, using disarranged nanofibers, and also provides a method for producing them.

This invention provides compound solutions, emulsions, gels and synthetic papers containing disarranged nanofibers of 1 to 500 nm in number average diameter and 60% or more in the sum Pa of single fiber ratios.



Fig. 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/002310

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl' D21H13/10, A61K7/00, 7/42, 7/48, D04H1/42, D21H15/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl' D21H13/10, A61K7/00, 7/42, 7/48, D04H1/42, D21H15/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Tokoku Koho 1996-2005  
Kokai Jitsuyo Shinan Koho 1971-2005 Tokoku Jitsuyo Shinan Koho 1994-2005

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2003-109569 A (Japan Vilene Co., Ltd.), 11 April, 2003 (11.04.03), Par. Nos. [0010], [0012] (Family: none)	1-10, 19-28, 37-46, 58-83 11-18, 29-36, 47-57
X	JP 2003-45752 A (Japan Vilene Co., Ltd.), 14 February, 2003 (14.02.03), Par. Nos. [0008], [0010] (Family: none)	1-10, 19-28, 37-46, 58-83 11-18, 29-36, 47-57
X	JP 2003-239170 A (Japan Vilene Co., Ltd.), 27 August, 2003 (27.08.03), Par. Nos. [0019], [0020] (Family: none)	1-10, 19-28, 37-46, 58-83 11-18, 29-36, 47-57

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search  
28 April, 2005 (28.04.05)Date of mailing of the international search report  
17 May, 2005 (17.05.05)Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/JP2005/002310

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-327386 A (Oji Paper Co., Ltd.), 15 November, 2002 (15.11.02), Par. Nos. [0016], [0020] (Family: none)	11-18, 29-36, 47-57
A	JP 2003-129393 A (Oji Paper Co., Ltd.), 08 May, 2003 (08.05.03), Par. Nos. [0005], [0010] (Family: none)	1-83
A	JP 2001-114631 A (L'Oreal), 24 April, 2001 (24.04.01), Full text & US 6489283 B1 & EP 1090626 A1	1-83
A	JP 2001-139753 A (L'Oreal), 22 May, 2001 (22.05.01), Full text & EP 1090627 A1	1-83
A	JP 2002-275032 A (L'Oreal), 25 September, 2002 (25.09.02), Full text & EP 1243251 A1	1-83
A	JP 2003-26564 A (L'Oreal), 29 January, 2003 (29.01.03), Full text & US 2003-24556 A1	1-83
A	JP 2004-35571 A (L'Oreal), 05 February, 2004 (05.02.04), Full text & EP 1090627 A1	1-83
A	JP 2001-64153 A (Shoji HAMAGASHIRA), 13 March, 2001 (13.03.01), Full text (Family: none)	1-83
A	JP 7-196440 A (Shiseido Co., Ltd.), 01 August, 1995 (01.08.95), Full text (Family: none)	1-83
A	JP 2002-20217 A (Pola Chemical Industries Inc.), 23 January, 2002 (23.01.02), Full text (Family: none)	1-83

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- JP 10147506 A [0006]
- JP 2001214081 A [0006]
- JP 2001261526 A [0006]
- JP 5186323 A [0006]
- JP 2000264632 A [0006]
- JP 7002639 A [0006]
- JP 2001089314 A [0006]
- JP 2003300844 A [0006]
- JP 7185294 A [0007]
- JP 2000128760 A [0007]
- JP 6211626 A [0007]
- JP 10067685 A [0007]
- JP 10087428 A [0007]
- JP 55028947 A [0010]
- JP 63215770 A [0010]
- JP 8027192 A [0010]
- JP 11100510 A [0010]
- JP 62039507 A [0010]
- JP 132523 A [0011]
- JP 2001064153 A [0012]
- JP 49008809 B [0013]
- JP 55110545 A [0013]
- JP 60034700 A [0013]
- JP 1118700 A [0013]
- US 3382305 A [0014]
- US 354603 A [0014]
- JP 56169899 A [0015]
- JP 4010992 A [0015]
- JP 2003059482 A [0015]
- JP 2003253555 A [0015]
- JP 8209583 A [0016]
- JP 2002266281 A [0016]
- JP 3113082 A [0018]
- JP 6272114 A [0018] [0080]
- JP 53106872 A [0202] [0202] [0273] [0273]

**Non-patent literature cited in the description**

- *Polymer*, 2002, vol. 43, 4403 [0019]
- *Polymer*, 1999, vol. 40, 4585 [0019]
- Plastic Data Book. Kogyo Chosakai Publishing Co., Ltd, 01 December 1999, 189 [0082]